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ABSTRACT

This document is one in a series which outlines performance objectives and instructional modules for a course of study in the management of wastewater treatment plants. The modules are arranged in an order appropriate for teaching students with no experience. The modules can also be rearranged and adapted for courses to upgrade personnel moving into supervisory positions or designed as a minicourse. Each module contains a statement of purpose, objectives, conditions, acceptable performance, instructor activity and student activity. The tasks are organized into the general categories of: normal operation, abnormal operation, preventive maintenance, corrective maintenance, laboratory control, systems interaction, and management/supervisory procedures. This volume emphasizes management and supervision procedures for wastewater facilities. Included are 19 modules. Each is concerned with a specific aspect of management/supervision including reports, budgets, personnel, public contacts, funding, and public relations. (CS)

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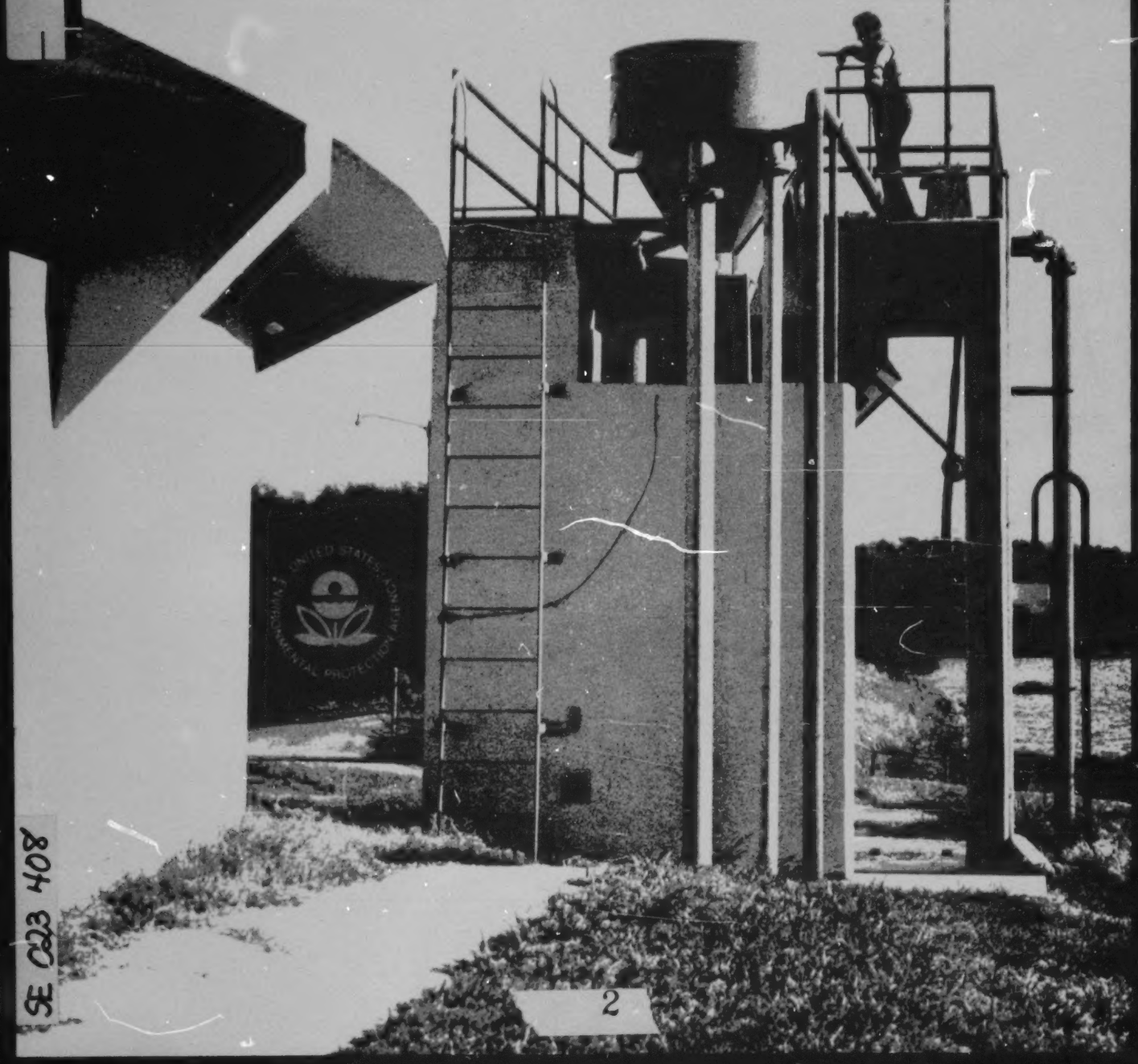
Volume IV

Management and Supervision Procedures for Wastewater Facilities

Wastewater Technology: A Two-Year Post High School Instructional Program



SE 023 408

MANAGEMENT AND SUPERVISION PROCEDURES FOR WASTEWATER FACILITIES

An Instructor's Guide for Use of Instructional Material
In Wastewater Technology Training Programs

Funded by

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ENVIRONMENTAL SYSTEMS ENGINEERING
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Preface

Since 1970 Charles County Community College, Clemson University, Greenville Technical College and Linn-Benton Community College have been working together to prepare undergraduate students to enter occupations in water and wastewater treatment plant operations and maintenance. Through their efforts a two-year wastewater technology instructional program based on performance objectives has been developed and implemented.

Through a grant from the Environmental Protection Agency called *Criteria for the Establishment of Two-Year Post High School Wastewater Technology Programs (CEWT)* the four colleges set up program criteria and curriculum guidelines which are available in two volumes:

Program Implementation Procedures
Curriculum Guidelines, Criteria for Establishment and Maintenance of Two-Year Post High School Wastewater Technology Programs

As a result tion of the instructional program at Charles County Community Colle Technical College and Linn-Benton Community College, six guides for i ctors based on the course descriptions in *Plant Implementation Procedures* and th eral criterion behaviors of *Curriculum Guidelines* have been prepared. *Management a n Procedures for Wastewater Facilities* is the fourth in the series whic

Volume *Introduction to Environmental Technology*
Volume *Plant Operations for Wastewater Facilities*
Volume *Control for Wastewater Facilities*
Volume *nd Supervision Procedures for Wastewater Facilities*
Volume V *Process Interaction for Wastewater Facilities*
Volume VI *Advanced Waste Treatment*

ACKNOWLEDGEMENTS

Since the beginning of the project many persons at the four cooperating institutions, as well as outside consultants have participated in the development of this program. Their efforts which have provided source material for this guide have been acknowledged in the volumes to which they made major contributions. *Management and Supervision Procedures for Wastewater Facilities* has been written and produced by:

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Table of Contents

		Page
PREFACE		iii
PERFORMANCE OBJECTIVES		1
INTRODUCTION TO MODULES OF INSTRUCTION		3
GLOSSARY OF VERBS		7
MODULES OF INSTRUCTION		
Module 1	Preparing Purchase and Service Orders	11
Module 2	Ordering Consumable Supplies	17
Module 3	Preparing Daily and Monthly Reports	23
Module 4	Preparing Annual Reports	29
Module 5	Preparing Annual Budgets	33
Module 6	Interviewing Prospective Employees	37
Module 7	Orienting New Employees	43
Module 8	Disciplining Employees	47
Module 9	Dismissing Employees	51
Module 10	Encouraging Professional Development	55
Module 11	Staffing the Treatment Plant	59
Module 12	Rewarding Employee Performance	63
Module 13	Handling Emergencies	67
Module 14	Maintaining Daily Operational Control	71
Module 15	Recommending Capital Improvements	75
Module 16	Explaining Operations to Citizens	79
Module 17	Responding to Complaints	83
Module 18	Seeking Support for Increased Funding	87
Module 19	Promoting the Treatment Plant Image	93

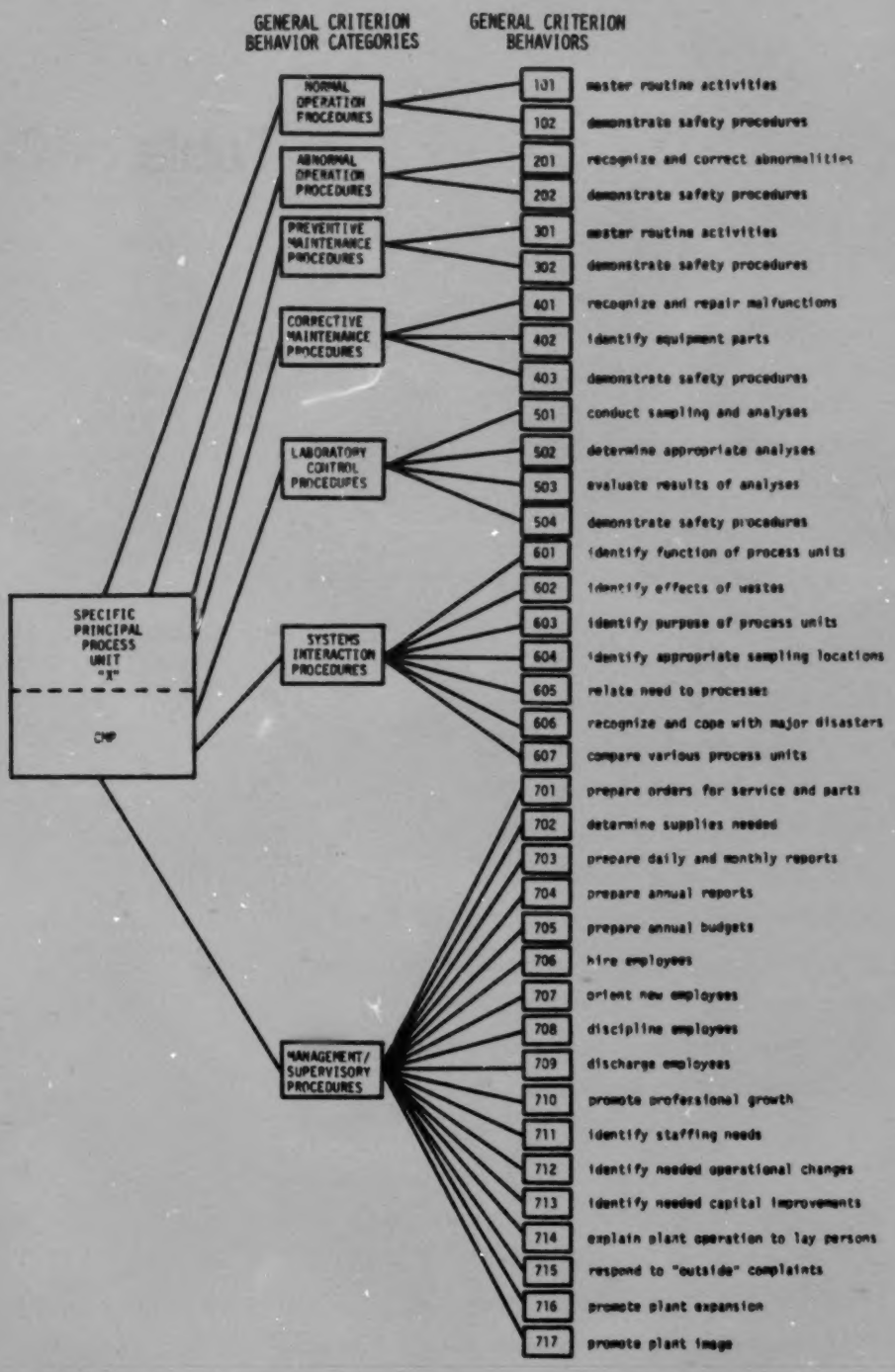
GENERAL CRITERION BEHAVIOR CATEGORIES
GENERAL CRITERION BEHAVIORS
NORMAL OPERATION PROCEDURES
ABNORMAL OPERATION PROCEDURES
PREVENTIVE MAINTENANCE PROCEDURES
CORRECTIVE MAINTENANCE PROCEDURES
LABORATORY CONTROL PROCEDURES
SYSTEMS INTERACTION PROCEDURES
MANAGEMENT/ SUPERVISORY PROCEDURES
SPECIFIC PRINCIPAL PROCESS UNIT "X"
CMP
101 master routine activities
102 demonstrate safety procedures
201 recognize and correct abnormalities
202 demonstrate safety procedures
301 master routine activities
302 demonstrate safety procedures
401 recognize and repair malfunctions
402 identify equipment parts
403 demonstrate safety procedures
501 conduct sampling and analyses
502 determine appropriate analyses
503 evaluate results of analyses
504 demonstrate safety procedures
601 identify function of process units
602 identify effects of wastes
603 identify purpose of process units
604 identify appropriate sampling locations
605 relate need to processes
606 recognize and cope with major disasters
607 compare various process units
701 prepare orders for service and parts
702 determine supplies needed
703 prepare daily and monthly reports
704 prepare annual reports
705 prepare annual budgets
706 hire employees
707 orient new employees
708 discipline employees
709 discharge employees
710 promote professional growth
711 identify staffing needs
712 identify needed operational changes
713 identify needed capital improvements
714 explain plant operation to lay persons
715 respond to "outside" complaints
716 promote plant expansion
717 promote plant image

Figure 1: Relationship of general criterion behaviors (performance objectives) to the general categories and composite model plant (CMP).

Performance Objectives

When the treatment plant operators, educators, consultants and representatives from professional water pollution control organizations came together to develop an effective instructional program, they recommended the use of performance or behavioral objectives because such objectives clearly outline:

1. What the student is expected to do as a result of the instructional program.
2. The conditions under which the student shall do it.
3. The standard of performance.

COMPOSITE MODEL PLANT

First, they developed a composite model plant (CMP) of twenty-two process units which is really many wastewater treatment plants in one model. Such a mix of process units seldom occurs in a treatment plant, but if a student becomes competent in the operation and management of the CMP he should be able to perform successfully in any treatment plant.

TASK ANALYSIS

Next, to ensure that the materials were specifically tailored to what the operator does on the job, a task analysis was conducted. They found that the tasks which an operator performs fell into seven general categories which were further divided into 37 tasks or general behaviors. (See figure 1, page vi.) The tasks were organized under:

1. Normal Operation Procedures. These include routine operating activities that do not vary significantly from day to day and that are designed to keep the plant functioning within a normal range of values. For example, the employee conducts routine samplings of the primary sludge and inspects pumping equipment and the wastestream to verify that the process is functioning properly.

2. Abnormal Operation Procedures. These include activities of the plant employee that result from unusual and undesirable conditions of the wastestream. The abnormal procedures enable the plant employee to recognize when the wastestream is abnormal and to return it to an acceptable, normal condition. An abnormal wastestream results when a normal operation procedure is not properly applied, a corrective maintenance procedure is needed or management/supervisory procedures are poor. For example, the plant employee should recognize that a black septic primary sludge sample is an abnormal condition of the wastestream and take appropriate action.

3. Preventive Maintenance Procedures. These include routine maintenance activities of the plant employee which prevent major equipment breakdown and subsequent corrective maintenance. For example, the employee would lubricate bearings and other moving parts, replace worn components and adjust components of the primary sludge pumps.

4. Corrective Maintenance Procedures. These include maintenance activities of the plant employee that usually result from the breakdown or malfunction of a unit of equipment or a component. For example, the employee would notice whether the primary sludge pump is malfunctioning and know when and how to correct the disorder or when and how to refer the problem to plant maintenance personnel.

5. Laboratory Control Procedures. These include special and routine activities relating to laboratory analysis, the specification of sampling procedures and locations and the general management of the laboratory facilities. For example, the employee would collect primary sludge samples and conduct the analyses.

6. Systems Interaction Procedures. These include activities of the plant employee which relate the functioning of specific units of equipment to other process units and to the system as a whole. For example, the employee would determine how the effective functioning of the primary sludge pumps relates to digester performance.

7. Management/Supervisory Procedures. These include activities relating to employment practices, record keeping, plant operation policy and the establishment of a constructive and realistic rapport between the plant and the community it serves. For example, the employee would keep records on primary sludge pumping, keep an inventory of spare parts and evaluate the adequacy of maintenance procedures by shift personnel.

CURRICULUM DESIGN

After deciding what process equipment an operator must operate and maintain, and finding out what an operator does through the task analysis, they listed the objectives a student must master to successfully operate and manage a treatment plant. For example, the student will describe and perform the normal inspection procedure for the primary sedimentation unit including frequency of inspection, conditions to look for and the actions he should take.

INSTRUCTOR'S GUIDES

The next step was the design of manuals to guide the instructor. In the guides varied learning activities and imaginative innovations which produce more learning than traditional teaching methods are emphasized. The instructional suggestions do not need to be followed slavishly, but should be modified and improved as much as possible.

The instructor's goal is to achieve the objectives of the curriculum by selecting activities which suit the student's needs and help him to master all the information and skills in the course. The most effective learning occurs when the student is a participant in the learning process, not a spectator.

An instructor should use learning activities which approximate the situations which the student will meet *in the treatment plant*. If it is not possible to teach in a treatment plant, *simulated situations* should be set up in the workshop or classroom so that the student can solve rather than discuss problems. *Group discussion* stimulated by *visual materials* is an effective learning technique. Lecturing, however, is inefficient. Because the student is not actively involved during a lecture, the instructor should use lectures sparingly.

Introduction to Modules of Instruction

In this instructor's guide the topics and ideas are presented as a series of modules, organized around the general objectives stated in the course descriptions for Purchasing and Reporting and Personnel Practices, Public Relations and Planning which are found in *Program Implementation Procedures* of the *CEWT Program*. The nineteen modules are designed to help the instructor plan a course of study for the management of a wastewater treatment plant.

The modules in *Management and Supervision Procedures for Wastewater Facilities* are arranged in an order appropriate for teaching students with no experience in treatment plant management. However, the modules can be rearranged and adapted for courses which upgrade personnel moving into supervisory positions. Each module is also designed as a minicourse. Instructors are urged to group the modules to suit their individual curriculum needs and instructional situations.

INSTRUCTIONAL SETTING

During training the student should have access to a model office with equipment and supplies which is typical of a one to 10 mgd wastewater treatment plant requiring the services of a superintendent, assistant superintendent, three foremen and a secretary.

PURPOSE OF THE MODULES

The modules in *Management and Supervision Procedures for Wastewater Facilities* help the student to learn how to manage a wastewater treatment plant. Purchasing, reporting, personnel, public relations and planning procedures are included.

STUDENT PREREQUISITES

Completion of Introduction to Environmental Technology, Plant Operations and In-Plant Practicum, Laboratory Control I and II, and courses in applied mathematics and technical report writing qualify the student to enter Management and Supervision Procedures for Wastewater Facilities. Concurrent courses in Applied Economics and Politics, Applied Psychology and Human Relations, Process Interaction and Advanced Waste Treatment are suggested. (See pages 7 to 19 of *Program Implementation Procedures.*)

TERMINAL OBJECTIVE

When the student has completed the modules of instruction in this course, he should be able to:

1. Prepare purchase and service orders.
2. Order consumable supplies.
3. Prepare daily and monthly reports.
4. Prepare annual reports.
5. Prepare annual budgets.
6. Interview prospective employees.

7. Orient new employees.
8. Discipline employees.
9. Dismiss employees.
10. Encourage professional development.
11. Staff the treatment plant.
12. Reward employee performance.
13. Handle emergencies.
14. Maintain daily operational control.
15. Recommend capital improvements.
16. Explain operations to citizens.
17. Respond to complaints.
18. Seek support for increased funding.
19. Promote the treatment plant image.

RESOURCES

The listing of instructional resources suggests materials now available to instructors to accomplish the desired performance in the student.

Instructional materials 1 to 2300 are keyed to *Water Quality Instructional Resources Information System (IRIS)* which is available from:

National Training Center
MOTD/OWPO
US Environmental Protection Agency
Cincinnati, Ohio 45268
513-684-7501

Suggestions for selecting audio-visual equipment can be found in *Selecting Audio-Visual Equipment* and *Selecting Instructional Media and Instructional Systems* available from:

Charles County Community College
La Plata, Maryland 20646

If suitable materials are not available, instructors are urged to develop their own resources.

FORMAT OF THE MODULES

The module begins with a statement of purpose which explains what the student will be studying. Next, code numbers keyed to a computerized list of instructional resources are listed for the instructor's convenience.

Objectives. The objectives bring the student to the performance level required by the terminal objective. The instructor's evaluation of the student is based solely on what is stated in the objective.

Conditions. The conditions define the circumstances under which the student performs and is evaluated and lists the information, equipment and assistance to which the student will have access. The best available learning and testing conditions should be used. The composite model plant which represents plant sizes from one to 10 mgd contains the recommended process units listed on pages 4 and 5 of *Plant Operations for Wastewater Facilities*.

Acceptable Performance. The acceptable performance expands the objective and details the steps a student must follow to reach the objective. To move on to the next objective the student must score 70% on each step listed under acceptable performance. In this section the instructor will find the main topics of his lesson plan and for the evaluation of the student's performance.

Instructor Activity. The instructor should get to know his class by working with small groups and with each student. He should encourage students to learn from each other as they work together. He should involve the student in the instructional and learning process. Group discussion and interaction should be emphasized. Films, filmstrips, slides, tapes, transparencies and case histories should be

used. Instructional activities are paired numerically with student activities.

Student Activity. This is a listing of activities which the student will take part in, in order to accomplish the specified performance.

EVALUATION TECHNIQUE

The instructor may use or adapt the learning activities listed under instructor activity and student activity as evaluation techniques. The technique chosen should reflect what the objective asks the student to do. For example, if a student is asked to *describe*, the evaluation technique is a *description*. The student should be evaluated under the conditions and to the performance level required for each objective.

Glossary of Verbs

The glossary of verbs is included so that the instructor will know exactly what the student is being asked to do to meet his objective. The list includes verbs used in the objectives and the acceptable performance sections of the modules, as well as in the instructor and student activities.

	DEFINITION	APPLICATION
ANALYZE	To study or determine the nature, significance and relationship of the parts.	Analyze daily and monthly performance reports.
APPLY	To make use of as suitable, fitting or relevant.	Apply the orientation schedule and program.
ASSESS	To analyze critically and judge the merit of.	Assess whether the serviced equipment is operating properly.
CHECK	To inspect and ascertain the condition of, especially in order to determine that the condition is satisfactory.	Check delivered merchandise against packing slip and purchase order.
CHOOSE	To select after consideration; to have a preference for.	Choose a discipline procedure.
COMMENT ON	To express an opinion or attitude about what has been seen or heard.	Comment on the student's taped interviews, asking students to suggest improvements.
COMPARE	To examine the character or qualities of, especially for the purpose of discovering resemblances of differences.	Compare delivered merchandise with packing slip and purchase order.
CONSIDER	To give thought to with a view to purchasing, accepting or adopting.	Consider the effect of disciplinary action on other employees.

	DEFINITION	APPLICATION
CONTRAST	To compare in respect to differences and relative worth.	Contrast the qualifications and skills of an apprentice, an intern, a journeyman and a trainee.
DECIDE	To induce to come to a choice or judgment.	Decide which applicant should be offered the position.
DEFINE	To determine the essential qualities or precise meaning of.	Define design performance, actual performance and problem analysis.
DEMONSTRATE	To illustrate or explain in an orderly and detailed way with many examples, specimens and particulars.	Demonstrate the procedures to follow upon receipt of a purchase.
DESCRIBE	To represent by words written or spoken for the knowledge or understanding of others; to transmit an image of the identifying features, the nature and characteristics of objects, events and actions.	Describe the procedures to follow if service is unsatisfactory.
DETERMINE	To come to a decision as the result of investigation or reasoning. To settle by choice of alternatives or possibilities.	Determine whether discipline is warranted.
DEVELOP	To produce or generate.	Develop a reference checklist.
DISCUSS	To talk about, to present in detail, to exchange views or information about.	Discuss the information used to prepare a purchase order.
DISPLAY	To spread before the view.	Display the information used during the interviewing process.
EVALUATE	To examine and make a judgment about quality, significance, amount, degree or condition of.	Evaluate the quality of service by examining and starting up a serviced unit.
EXAMINE	To inspect closely.	Examine sample purchase order forms, noting the information required for completing the forms.

	DEFINITION	APPLICATION
EXPLAIN	To make plain or clear; to present in detail.	Explain why the purchase is necessary, stating why the unit is important to plant operation.
IMPLEMENT	To carry out; fulfill.	Implement operational changes.
INITIATE	To begin or set going the first actions, steps or stages of.	Initiate steps to correct errors.
INSTITUTE	To ordain or enjoin to be done; cause to come into existance.	Institute dismissal procedures.
JUSTIFY	To prove or show to be just, desirable, warranted or useful.	Justify the purchase of a unit to students playing the roles of government officials.
LIST	To enumerate or specify.	List the information used to justify and complete a purchase order.
LOCATE	To determine or indicate the place, site or limits of.	Locate the information used to complete the purchase order.
NOTE	Observe with care.	Note the calculations used.
OBSERVE	To pay careful, directed, analytical attention to.	Observe the student's behavior, commenting on the effectiveness of the tour.
PERFORM	To carry out an action or pattern of behavior. (Implies an act for which a process or pattern of movement has already been established, especially one calling for skill or precision, or for the assignment or assumption of responsibility.)	Perform the calculations.
POINT OUT	To indicate the position of, direction of, especially by extending a finger toward the thing so indicated; to direct someone's attention to.	Point out cases in which appropriate procedures and systems were used.
RANK	To determine the relative position or merit of.	Rank the applicants according to their ability to fulfill the duties as outlined.

	DEFINITION	APPLICATION
REACT	To respond to a stimulus or particular situation.	React to the instructor's evaluation.
RECOMMEND	To mention or introduce as being worthy of acceptance, use or trial; to advise.	Recommend an applicant for the position.
RESPOND	To say something in return; answer.	Respond to the complaintant.
REVIEW	To go over or examine critically or deliberately.	Review the interviewer's written reports and impressions.
SELECT	To choose something from a number or group usually by fitness, excellence or other distinguishing feature.	Select the references for completing the purchase order.
SUGGEST	To propose as desirable or fitting.	Suggest an appropriate development program after reading profiles of operators.

Module 1

PREPARING PURCHASE AND SERVICE ORDERS

PURPOSE: In order to complete a purchase order or a service order, a wastewater treatment plant operator must supply pertinent information about a process unit or a component for the plant purchasing agency and the manufacturer. In this module the student will learn about the sources of this information and use it to prepare service and purchase orders. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES: 108 281 363 365 1520

<<<<<<>>>>>>

OBJECTIVE 1.1: *List the references and kinds of information used to complete a purchase order and a service order.*

CONDITIONS: Given the name of a process unit, a component or components of a unit.

ACCEPTABLE PERFORMANCE: The student will:

List the information used to justify and complete a purchase order, including:
- date
- delivery and installation times
- equipment inventory and I.D. cards
- equipment name
- equipment priority
- f.o.b. information
- forms
- model number
- part number
- price
- purchase procedures
- serial number
- size
- tax
- warranty terms

List the references for preparing a purchase order, including:

- catalogs
- design engineer's specifications
- listings of manufacturers
- manufacturer's representative's card book
- manufacturers' operating instructions
- manufacturers' part lists
- shop drawings
- telephone book

List the information used to complete a service order, including:

- date
- equipment name
- manufacturers' operating instructions
- model number
- part number
- serial number
- size
- telephone book
- warranty terms

List the references for preparing a service order, including:

- equipment name
- manu operating instructions
- num
- numb
- serial nu
- size
- teleph
- war rms

INSTRUCTOR ACTIVITY:

1. Di nformation used to prepare a purchase order and a service order, displaying sample forms.
2. Discuss and display the references for preparing purchase orders and service orders.

STUDENT ACTIVITY:

1. Examine sample purchase order and service order forms, noting the information required for completing the forms.
2. Examine the references used for preparing a purchase order and a service order. Develop a reference checklist.

<<<<<<>>>>>>

OBJECTIVE 1.2: *Prepare a purchase order.*

CONDITIONS: Given the name of a process unit, a component or components of a unit, references, information and purchase order forms.

ACCEPTABLE PERFORMANCE: The student will:

Explain why the purchase is necessary, stating why the unit or component is important to plant or unit operation.

Select the references for completing the purchase order.

Locate the information used to complete the purchase order.

Complete purchase order forms for different units or components.

INSTRUCTOR ACTIVITY:

1. Discuss justification of purchases from the purchaser's viewpoint, presenting examples.
2. Present a list of questions asked by purchasing agents, government officials and citizens.
3. Discuss and explain the kinds of information found in each reference.
4. Complete sample forms with the help of students who locate the information in the reference.

STUDENT ACTIVITY:

1. Examine examples of justifications, discussing the effectiveness of the arguments presented.
2. Justify the purchase of a unit or component to students playing the roles of government officials, citizens and purchasing agents.
3. Select the references which contain the information used to complete purchase orders for a list of process units or components.
4. Prepare purchase orders.

<<<<<<>>>>>>

OBJECTIVE 1.3: *Prepare a service order.*

CONDITIONS: Given the name of a process unit, a component or components of a unit, references, information and service order forms.

ACCEPTABLE PERFORMANCE: The student will:

Explain why the service is necessary, stating why the unit or component is important to plant or unit operation.

Select the references for completing the service order.

Locate the information used to complete the service order.

Complete service order forms for different units or components.

INSTRUCTOR ACTIVITY:

1. Discuss justification of services from the operator's viewpoint, presenting examples.
2. Present a list of questions asked by the person who authorizes plant service, government officials and citizens.
3. Discuss and explain the kinds of information found in each reference.
4. Complete sample forms with the help of students who locate the information in the references.

STUDENT ACTIVITY:

1. Examine examples of justifications, discussing the effectiveness of the arguments presented.
2. Justify the services of a unit or component to students playing the roles of government officials, citizens and purchasing agents.
3. Select the references which contain the information used to complete service orders for a list of process units or components.
4. Prepare purchase orders.

<<<<<<>>>>>>

OBJECTIVE 1.4: *Receive delivery of the process unit or components purchased.*

CONDITIONS: Given the delivered unit or components, the packing slip and purchase order.

ACCEPTABLE PERFORMANCE: The student will:

Check delivered merchandise against packing slip and purchase order.

Note discrepancies.

Initiate steps to correct errors.

INSTRUCTOR ACTIVITY:

1. Demonstrate the procedures to follow upon receipt of a purchase.
2. Discuss actions to take if an order is incomplete or it does not conform to purchase order.

STUDENT ACTIVITY:

1. Compare delivered merchandise with packing slip and purchase order.
2. Explain the procedure to follow if an order is not properly filled.

<<<<<<>>>>>>

OBJECTIVE 1.5: *Certify that a contracted service has been performed satisfactorily.*

CONDITIONS: Given a serviced unit or component and the service order and contract.

ACCEPTABLE PERFORMANCE: The student will:

Assess whether the serviced equipment is operating properly.

Take action if the service is unsatisfactory.

INSTRUCTOR ACTIVITY:

1. Describe how to determine whether a service has been performed satisfactorily.
2. Describe the procedures to follow if service is unsatisfactory.

STUDENT ACTIVITY:

1. Evaluate the quality of service by examining and starting up a serviced unit or components.
2. Write letters which explain why a service is not satisfactory and what corrective steps must be taken to meet the terms of the service contract.

<<<<<<>>>>>>

Module 2

ORDERING CONSUMABLE SUPPLIES

PURPOSE: Most wastewater treatment plants purchase janitorial supplies, laboratory chemicals, chlorine and other consumable supplies annually by bid. In this module the student will learn inventory procedures and to prepare the annual order of consumable supplies for bidding. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES: 108 281 363 365 1220 1520

<<<<<<>>>>>>

OBJECTIVE 2.1: *List the references and kinds of information used to inventory consumable supplies.*

CONDITIONS: Given the composite model plant, budget limits, budget categories and deadlines.

ACCEPTABLE PERFORMANCE: The student will:

List the information used to inventory consumable supplies, including:
- annual plant budget
- bid specification forms
- handling costs
- housekeeping requirements
- laboratory test and monitoring requirements
- lubrication schedules
- maintenance requirements
- materials delivery
- materials delivery schedule
- personnel clothing requirements
- physical plant
- plant log
- present inventory
- previous year's usage
- projected change in number of personnel

projected change in plant
purchase procedure
rates of materials usage
record keeping requirements
safety regulations
storage life of materials
storage space available
training requirements

List the references for inventorying consumable supplies, including:
effluent standards or receiving water standards
equipment specifications
landscaping designs
major equipment list
manufacturers' manuals
materials price lists
permit requirements
personnel roster
plant as-built prints
plant contract specifications
safety manual
shift schedule
union contracts

List the kinds of supplies to be inventoried, including:
automotive supplies
clothing
filters
fuels
gardening supplies
janitorial supplies
laboratory chemicals
light bulbs
lubricants
office supplies
packing
paint
process chemicals
rags
safety supplies
welding supplies

List the calculations used to conduct an inventory, including:
calculator cost on larger purchase versus storage costs
cost per unit comparisons
load limits of storage area
usage per unit

INSTRUCTOR ACTIVITY:

1. Discuss and display the information used to inventory consumable supplies.
2. Discuss and display the references for inventorying consumable supplies.
3. Discuss the kinds of supplies to be inventoried.
4. Discuss the calculations used to inventory consumable supplies.

STUDENT ACTIVITY:

1. Develop a checklist of information used to inventory consumable supplies.
2. Examine the references. Develop a reference checklist.
3. Develop a checklist of the kinds of supplies to be inventoried.
4. Note the calculations used.

<<<<<<>>>>>>

OBJECTIVE 2.2: *Describe and compare inventory procedures and systems.*

CONDITIONS: Given the composite model plant, budget limits, budget categories, deadlines and the student's checklists.

ACCEPTABLE PERFORMANCE: The student will:

Describe inventory procedures and systems.

Compare the systems.

INSTRUCTOR ACTIVITY:

1. Describe inventory procedures and systems.
2. Point out the similarities and differences in the systems and the situations in which they are used.
3. Present case studies in which the inventory procedures and systems have been used.

STUDENT ACTIVITY:

1. Examine the forms used for a running inventory, discussing the procedures for this system. List the steps in the procedure.
2. Compare the running inventory to other systems.
3. Point out in which cases appropriate procedures and systems were used. Suggest appropriate systems for use in the other cases.

<<<<<<>>>>>>

OBJECTIVE 2.3: *Inventory the consumable supplies in a wastewater treatment plant.*

CONDITIONS: Given the composite model plant, budget limits, budget categories, deadlines, the student's checklists, references, plant records and information.

ACCEPTABLE PERFORMANCE: The student will:

Select an inventory system.

Locate the information used.

Select the references.

Perform the calculations.

Conduct the inventory.

INSTRUCTOR ACTIVITY:

1. Discuss and explain the kinds of information found in each reference.
2. Complete sample forms and outline inventory procedures with the help of the student.

STUDENT ACTIVITY:

1. Select the references and locate the information used to conduct an inventory.
2. Inventory the supplies in a wastewater treatment plant.

<<<<<<>>>>>>

OBJECTIVE 2.4: *List the references and kinds of information used to prepare bid specifications for a year's supply of consumable materials for a treatment plant.*

CONDITIONS: Given the composite model plant, budget limits, budget categories, deadlines and a list of the kinds of supplies in the composite model plant.

ACCEPTABLE PERFORMANCE: The student will:

List the information used to prepare bid specifications, including:
- annual plant budget
- bid specification forms
- handling costs
- housekeeping requirements

laboratory test and monitoring requirements
lubrication schedules
maintenance requirements
materials delivery
materials delivery schedule
personnel clothing requirements
physical plant
plant log
present inventory
previous year's usage
projected change in number of personnel
projected change in plant
purchase procedure
rates of materials usage
record keeping requirements
safety regulations
storage life of materials
storage space available
training requirements

List the references for preparing bid specifications, including:
effluent standards or receiving water standards
equipment specifications
landscaping designs
major equipment list
manufacturers' manuals
materials price lists
permit requirements
personnel roster
plant as-built prints
plant contract specifications
safety manual
shift schedule
union contracts

List the calculations used to prepare bid specifications, including:
calculator cost on larger purchase versus storage costs
cost per unit comparisons
load limits of storage area
usage per unit

Explain the meaning of:
blanket purchase order
competitive bid
cost analysis
lowest and most reasonable bid
purchase order
responsible bidder
request to purchasing agent

INSTRUCTOR ACTIVITY:

1. Discuss the information used to prepare bid specifications, displaying sample forms.
2. Discuss and display the references.
3. Discuss the calculations used. Define special terms.

STUDENT ACTIVITY:

1. Develop a checklist of information used to prepare bid specifications.
2. Examine the references. Develop a reference checklist.
3. Note the calculations used. Explain the meaning of the special terms.

<<<<<<>>>>>>

OBJECTIVE 2.5: *Prepare bid specifications for consumable supplies in a wastewater treatment plant.*

CONDITIONS: Given the composite model plant, budget limits, budget categories, deadlines, the student's checklists, references, plant records, information, and bid specification forms.

ACCEPTABLE PERFORMANCE: The student will:

Locate the information used.

Select the references.

Perform the calculations.

Prepare the bid specifications.

INSTRUCTOR ACTIVITY:

1. Discuss and explain the kinds of information found in each reference.
2. Present plant inventories and specifications for bidding. Complete sample forms with the help of the students. Outline procedures for preparing bid specifications for competitive bidding.

STUDENT ACTIVITY:

1. Select the references and locate the information used to prepare bid specifications.
2. Prepare bid specifications.

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Module 3

PREPARING DAILY AND MONTHLY REPORTS

PURPOSE: In this module the student will learn to gather the information used to complete daily and monthly reports and to prepare the reports. Since all wastewater treatment plants must now submit monthly reports to meet the requirements for permits under the National Pollutant Discharge Elimination System, special emphasis is given to preparing these reports. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES: 108 281 381 399 1226 1583

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OBJECTIVE 3.1: *List the references and kinds of information used to prepare daily and monthly plant performance reports.*

CONDITIONS: Given the composite model plant, a list of the reports required, report forms, budget limits, budget categories and deadlines.

ACCEPTABLE PERFORMANCE: The student will:

List the points to consider when preparing daily and monthly plant performance reports, including:
- loadings on operational units
- machinery performance
- maintenance costs
- material costs and purchases
- operating costs
- personnel performance
- unit efficiencies

List the information used to prepare daily and monthly plant performance reports, including:
- changes
- hourmeter readings

inventories of consumable supplies
machinery records
maintenance records
operator log sheets
person for whom report is prepared
personnel records
plant modifications
plant records
power consumption
purchasing methods
purpose of report
results of laboratory analyses
timekeeping records
utility costs

List the references for preparing daily and monthly plant performance reports, including:
effluent standards or receiving water standards
equipment specifications
plant as-built prints
plant design specifications
plant specifications
shift schedules
standard report forms

List the calculations used to prepare daily and monthly plant performance reports, including:
effluent load to receiving waters
percentage of design expectations
personnel costs
unit and plant loading rates and efficiences

INSTRUCTOR ACTIVITY:

1. Discuss the points to consider when preparing daily and monthly plant performance reports.
2. Discuss and display the information used to prepare daily and monthly plant performance reports.
3. Discuss and display the references for preparing daily and monthly plant performance reports.
4. Discuss the calculations used to prepare daily and monthly plant performance reports.

STUDENT ACTIVITY:

1. Note the points to consider when preparing daily and monthly plant performance reports.
2. Develop a checklist of information used to prepare daily and monthly plant performance reports.
3. Examine the references for preparing daily and monthly plant performance reports. Develop a reference checklist.

4. Note the calculations used to prepare daily and monthly plant performance reports.

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OBJECTIVE 3.2: *Prepare daily and monthly plant performance reports.*

CONDITIONS: Given the composite model plant, a list of the reports required, report forms, budget limits, budget categories, deadlines, the student's checklists, references, plant records and information.

ACCEPTABLE PERFORMANCE: The student will:

Locate the information used.

Select the references.

Perform the calculations.

Prepare the reports.

INSTRUCTOR ACTIVITY:

1. Discuss and explain the kinds of information found in each reference.
2. Discuss the points that must be considered.
3. Complete sample forms and describe reporting procedures with the help of the student.

STUDENT ACTIVITY:

1. Select the references and locate the information.
2. Prepare an outline for the reports.
3. Complete the reports.

<<<<<<>>>>>>

OBJECTIVE 3.3: *List the references and kinds of information used to prepare reports under the National Pollutant Discharge Elimination System (NPDES) and other regulatory agency reports.*

CONDITIONS: Given the composite model plant, an NPDES permit, a list of the reports required and report forms.

ACCEPTABLE PERFORMANCE: The student will:

List the points to consider when preparing NPDES and other regulatory agency reports, including:
- loadings on operational units
- machinery performance
- maintenance costs
- material costs and purchases
- operating costs
- personnel performance
- unit efficiencies

List the information used to prepare NPDES reports and other regulatory agency reports, including:
- monitoring requirements
- operator log sheets
- plant records
- results of laboratory analyses

List the references for preparing NPDES reports and other regulatory agency reports, including:
- effluent standards or receiving water standards
- equipment specifications
- plant as-built prints
- plant design specifications
- plant specifications
- shift schedules
- standard report forms

List the calculations used to prepare NPDES reports and other regulatory agency reports, including:
- effluent load to receiving waters
- percentage of design expectations
- personnel costs
- unit and plant loading rates and efficiences
- unit costs

INSTRUCTOR ACTIVITY:

1. Discuss the points to consider when preparing NPDES reports and other regulatory agency reports.
2. Discuss and display the information used to prepare NPDES reports and other regulatory agency reports.
3. Discuss and display the references for preparing NPDES reports and other regulatory agency reports.
4. Discuss the calculations used to prepare NPDES reports and other regulatory agency reports.

STUDENT ACTIVITY:

1. Note the points to consider when preparing NPDES reports and other regulatory agency reports.

2. Develop a checklist of information used to prepare NPDES reports and other regulatory agency reports.
3. Examine the references for preparing NPDES reports and other regulatory agency reports.
4. Note the calculations used to prepare NPDES reports and other regulatory agency reports.

<<<<<<>>>>>>

OBJECTIVE 3.4: *Prepare NPDES reports and other regulatory agency reports.*

CONDITIONS: Given the composite model plant, a list of the reports required, report forms, the student's checklists, references, plant records and information.

ACCEPTABLE PERFORMANCE: The student will:

Locate the information used.

Select the references.

Perform the calculations.

Prepare the reports.

INSTRUCTOR ACTIVITY:

1. Discuss and explain the kinds of information found in each reference.
2. Discuss the points that must be considered.
3. Complete sample forms and describe reporting procedures with the help of the student.

STUDENT ACTIVITY:

1. Select the references and locate the information.
2. Prepare an outline for the reports.
3. Complete the reports.

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Module 4

PREPARING ANNUAL REPORTS

PURPOSE: In this module the student will learn to prepare the annual operation and maintenance report for a wastewater treatment plant. Through the operation and maintenance report, city engineers and councils inform citizens about expenditures, capital investments and the performance of the treatment facility. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES: 108 281 381 399 1226 1583

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OBJECTIVE 4.1: *List the references and kinds of information used to prepare an annual operation and maintenance report.*

CONDITIONS: Given the composite model plant, budget limits, budget categories and deadlines.

ACCEPTABLE PERFORMANCE: The student will:

List the points to consider when preparing an annual operation and maintenance report, including:
- effluent quality
- loadings on operational units
- machinery performance
- personnel performance
- safety
- timekeeping records
- total efficiency
- total loading
- training
- unit efficiencies

List the information used to prepare an annual operation and maintenance report, including:
- capital expenditures
- cost breakdowns

hourmeter readings
kinds of personnel
laboratory reports
machinery records
maintenance procedure changes
maintenance requirements
number of personnel
operations log
organizational chart
payroll costs
personal diary
personnel changes
personnel records
plant records
safety records
salary schedules
training provided
training results
unit operating problems and changes

List the references for preparing an annual operation and maintenance report, including:
monthly reports
plant as-built prints
plant specifications
report format
shift schedules

List the calculations used to prepare an annual operation and maintenance report, including:
chronological changes in loading
cost per unit maintenance
cost per unit operation
cost per unit treated
percentage of design expectations
pounds of effluent to receiving waters
unit efficiencies
unit loads

INSTRUCTOR ACTIVITY:

1. Discuss the points to consider when preparing annual operation and maintenance reports.
2. Discuss and display the information used to prepare annual operation and maintenance reports.
3. Discuss and display the references for preparing annual operation and maintenance reports.
4. Discuss the calculations used to prepare annual operation and maintenance reports.

STUDENT ACTIVITY:

1. Note the points to consider when preparing annual operation and maintenance reports.

2. Develop a checklist of information used to prepare annual operation and maintenance reports.
3. Examine the references for preparing an annual operation and maintenance report. Develop a reference checklist.
4. Note the calculations used to prepare annual operation and maintenance reports.

<<<<<<>>>>>>

OBJECTIVE 4.2: *Compare formats for annual operation and maintenance reports.*

CONDITIONS: Given three different report formats, the composite model plant, budget limits, budget categories and the student's checklists.

ACCEPTABLE PERFORMANCE: The student will:

Describe each format.

Compare the formats.

INSTRUCTOR ACTIVITY:

1. Describe report formats, using reports as examples.
2. Point out the similarities and differences in the reports and the situations in which they are used.

STUDENT ACTIVITY:

1. Examine formats used for annual operation and maintenance reports.
2. Compare the reporting formats.

<<<<<<>>>>>>

OBJECTIVE 4.3: *Prepare an annual operation and maintenance report.*

CONDITIONS: Given the composite model plant, report forms, budget limits, budget categories, deadlines, the student's checklists, references, plant records and information.

ACCEPTABLE PERFORMANCE: The student will:

Select a report format.

Locate the information used.

Select the references.

Perform the calculations.

Prepare the report.

INSTRUCTOR ACTIVITY:

1. Discuss and explain the kinds of information found in each reference.
2. Discuss the points that must be considered.
3. Complete sample forms and describe reporting procedures with the help of the student.

STUDENT ACTIVITY:

1. Select the references and locate the information for the report.
2. Prepare an outline for the report.
3. Complete the report.

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Module 5

PREPARING ANNUAL BUDGETS

PURPOSE: In this module the student will learn to prepare annual budgets, projecting and justifying the expenditures. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES: 108 281 360 385 399 1220 1226

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OBJECTIVE 5.1: *List the references and kinds of information used to prepare annual operation and maintenance budgets.*

CONDITIONS: Given the composite model plant, budget limits, budget categories and deadlines.

ACCEPTABLE PERFORMANCE: The student will:

List the points to consider when preparing annual operation and maintenance budgets, including:
- changes in effluent requirements or receiving water requirements
- fringe benefits
- local economic trends
- union agreements

List the information used to prepare annual operation and maintenance budgets, including:
- budget restrictions
- chemicals
- construction time schedules and details
- current costs per unit
- data to support a purchase request
- details of planned expansion
- housekeeping requirements
- kinds of personnel
- monitoring requirements
- number of personnel
- personnel changes

reliability
replacement parts and machinery
supplies
unit design loading limits
utility
variation in municipal usage
work load data

List the references for preparing annual operation and maintenance budgets, including:
annual operation and maintenance reports
budget guides
effluent standards or receiving water standards
Engineering News Record index reports
equipment catalogs
growth of population
growth of service area
laboratory reports
operations log
planning commission reports
plant as-built prints
plant specifications
recording charts

List the calculations used to prepare annual operation and maintenance budgets, including:
comparative costing of alternative operations
costs per unit operation or maintenance
percentage of change in costs

INSTRUCTOR ACTIVITY:

1. Discuss the points to consider when preparing annual operation and maintenance budgets.
2. Discuss and display the information used to prepare annual operation and maintenance budgets.
3. Discuss and display the references for preparing annual operation and maintenance budgets.
4. Discuss the calculations used to prepare annual operation and maintenance budgets.

STUDENT ACTIVITY:

1. Note the points to consider when preparing annual operation and maintenance budgets.
2. Develop a checklist of information used to prepare annual operation and maintenance budgets.
3. Examine the references for preparing annual operation and maintenance budgets. Develop a reference checklist.
4. Note the calculations used to prepare daily and monthly plant performance reports.

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OBJECTIVE 5.2: *Describe budgeting procedures.*

CONDITIONS: Given the composite model plant, budget limits, budget categories, deadlines, the student's checklists, references, plant records and information.

ACCEPTABLE PERFORMANCE: The student will:

List the steps in the budgeting process.

Describe the procedures during each step of the budgeting process.

INSTRUCTOR ACTIVITY:

1. Outline the budgeting process.
2. Prepare a sample budget, explaining the purpose of each step in the process.

STUDENT ACTIVITY:

1. Prepare a checklist of steps in the budgeting procedure.
2. Explain why it is important to follow the steps of process in order. Describe what happens during each step.

<<<<<<>>>>>>

OBJECTIVE 5.3: *Prepare an annual operation and maintenance budget.*

CONDITIONS: Given the composite model plant, report forms, budget limits, budget categories, deadlines, the student's checklists, references, plant records and information.

ACCEPTABLE PERFORMANCE: The student will:

Locate the information used.

Select the references.

Perform the calculations.

Justify budgeted expenditures.

Prepare the budget.

INSTRUCTOR ACTIVITY:

1. Discuss and explain the kinds of information found in each reference.

2. Discuss the points that must be considered in budgeting.
3. Discuss justifying budget expenditures, commenting on the effectiveness of arguments presented.
4. Discuss budget revisions based on budget cuts or additional appropriations.
5. Complete sample budgets with the help of students.

STUDENT ACTIVITY:

1. Select the references and locate the information for preparing an annual operation and maintenance budget.
2. Prepare a draft of an annual budget.
3. Justify proposed budget expenditures to students playing the roles of government officials and citizens.
4. Revise the budget because funds have been cut or appropriations raised.
5. Prepare the final budget.

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Module 6

INTERVIEWING PROSPECTIVE EMPLOYEES

PURPOSE: Because a manager's personnel decisions dramatically affect treatment plant operation, he must skillfully evaluate verbal and nonverbal communications when interviewing applicants for employment. In this module the student will learn to conduct interviews and to evaluate the qualifications of applicants. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES: 108 109 281 337 338 352 358 1191 1519

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OBJECTIVE 6.1: *Describe interviewing procedures.*

CONDITIONS: Given a list of the kinds of employees who work in a wastewater treatment plant, including:

- chemists
- draftsmen
- electricians
- gardners
- instrument technicians
- laboratory technicians
- laborers
- machinists
- maintenance and operating supervisors
- mechanics
- operators
- painters
- plumbers
- secretary-receptionists

ACCEPTABLE PERFORMANCE: The student will:

Explain the meaning of:

- apprentice
- intern

journeyman
trainee

List the information used during the interviewing process, including:
- application forms
- aptitude tests and results
- civil service regulations
- I.Q. tests and results
- job class specifications
- medical history
- nondiscriminatory requirements
- ranking system
- union contracts

Explain how the information is used during the interviewing process.

List the aspects of the applicant's behavior to be observed and other points to be considered, including:
- aspirations
- conduct during interview
- outside activities
- personal appearance
- poise
- previous employment reference check
- previous experience
- skills and qualifications

Explain how these observations and considerations are used when deciding whether to employ an applicant.

Describe interviewing techniques.

Describe procedures for evaluating applicants after interviews and notifying them of the results, considering:
- applicant's normal apprehension during an interview
- independence or dependence
- previous salary and security
- relationship to existing crew
- relative importance of each consideration to the position being filled

INSTRUCTOR ACTIVITY:

1. Contrast the qualifications and skills of an apprentice, an intern, a journeyman and a trainee.
2. Display the information used during the interviewing process.
3. Explain how the information is used to prepare for an interview and to make decisions about an applicant's qualifications.

4. List the aspects of an applicant's behavior and qualifications which the interviewer observes and considers.
5. Describe the behavior and qualifications of applicants, explaining the conclusions which might be drawn.
6. Describe what happens during an interview, discussing the kinds of questions to ask and avoid.
7. Comment on the student's taped interviews, asking students to suggest improvements.
8. Describe interviews. Explain the conclusions an interviewer might draw from an applicant's behavior during an interview. Discuss how this behavior should relate to the decisions an interviewer makes.
9. Outline the procedures to follow when a decision has been made to offer the position to an applicant.

STUDENT ACTIVITY:

1. Read descriptions of applicants' qualifications, noting the level of their skills.
2. Develop a checklist of information used during the interviewing process.
3. Examine the information. Explain how it is used to prepare for an interview and to make decisions about an applicant's qualifications.
4. Develop a checklist of the aspects of an applicant's behavior for observation and other points for consideration.
5. Review the behavior and other qualifications of applicants, discussing their strengths and weaknesses.
6. Look at sample job descriptions and applications, noting the questions and subject areas to be discussed during the interviews.
7. Practice interviewing other students who role play applicants. Record the interviews on tape.
8. Explain an applicant's behavior during an interview and how it influences the decision an interviewer makes.
9. Describe what an operator does when a decision has been made to offer a position to an applicant.

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OBJECTIVE 6.2: *Interview applicants for employment.*

CONDITIONS: Given a job description, the interviewees' application forms, other information and the student's checklists.

ACCEPTABLE PERFORMANCE: The student will:

Read the job description and the interviewee's application, recording questions to use during the interview.

Conduct the interview.

Record the results of the interview, noting impressions and reactions.

INSTRUCTOR ACTIVITY:

1. Comment on the appropriateness of the questions the student plans to use during interviews.
2. Ask students to comment on the techniques of the interviewer.
3. Review the interviewer's written reports and impressions of the applicants. Ask students whether they agree.

STUDENT ACTIVITY:

1. Prepare for interviews by gathering information and listing questions to ask the applicants.
2. Interview other students who are role playing applicants.
3. Record the results of the interviews and note additional information needed.

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OBJECTIVE 6.3: *Evaluate an applicant's qualifications and the results of an interview.*

CONDITIONS: Given a job description, the interviewees' application forms, other information, the student's checklists and the recorded results of the interviews.

ACCEPTABLE PERFORMANCE: The student will:

Compare the applicant with other interviewees, ranking them according to qualifications.

Recommend an applicant for the position, justifying the decision in writing.

Offer the job to the recommended applicant, initiating employment procedures when the applicant accepts the position.

Inform other applicants of the results of the interviewing process.

INSTRUCTOR ACTIVITY:

1. Ask students who have been observing interviews to rank the applicants.
2. Compare the rankings and preferred applicant of the student observers with the recommendations of the interviewer.

3. Present examples of letters offering the position to the applicant. Comment on interviewer's letter.
4. Present examples of letters informing applicants of the outcome of the interviewing process. Critique interviewer's letters.

STUDENT ACTIVITY:

1. Rank the applicants according to their ability to fulfill the duties as outlined in the job description. Explain why the decisions were made.
2. Decide which applicant should be offered the position, explaining the reasons for the choice. Note whether any other applicants are qualified, if the preferred applicant refuses to accept the position.
3. Notify the successful applicant.
4. Notify unsuccessful candidates of the results of the interviews.

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Module 7

ORIENTING NEW EMPLOYEES

PURPOSE: This module emphasizes the kinds of information and the methods used to introduce a new employee to his job. A successful orientation program will enable the new employee to be more productive during the early months of his employment. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES: 108 109 281 337 338 352 1191 1519

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OBJECTIVE 7.1: *Describe employee orientation procedures.*

CONDITIONS: Given a description of a treatment plant, its operational organization and a list of the kinds of employees which must be oriented, including:

- chemists
- draftsmen
- electricians
- gardners
- instrument technicians
- laboratory technicians
- laborers
- machinists
- maintenance and operating supervisors
- mechanics
- operators
- painters
- plumbers
- secretary-receptionists

ACCEPTABLE PERFORMANCE: The student will:

List the kinds of information used during employee orientation, including:

- advancement opportunities
- annual operation and maintenance reports

city maps
financing
flow diagrams
fringe benefit schedules
history of the organization
hours of work
insurance brochures
organization charts
pay
pay schedules
pensions
personal aspirations of employee
personnel pamphlets
plant descriptions
plant map
plant rules and regulations
promotion requirements
revenue schedules
safety regulations
salary
security
shift schedules
vacation schedules
workmen's compensation laws

Describe why orientation is important, commenting on:
efficiency
motivation
prevention of personnel problems
production

Develop an orientation program and package, commenting on the steps, method, length and location of the orientation.

INSTRUCTOR ACTIVITY:

1. Display the information used during employee orientation.
2. Describe the effects of orientation on employee performance.
3. Present orientation packages and schedules used in treatment plants. Comment on the purposes and appropriateness of the materials and the scheduled activities.

STUDENT ACTIVITY:

1. Develop a checklist of the information used during orientation.
2. Examine case studies of the adjustment of new employees. Comment on the effectiveness of their orientation. Suggest remedies.

3. Develop an orientation package and schedule, outlining the presentation techniques and explaining the purpose of the materials and activities.

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OBJECTIVE 7.2: *Conduct an employee orientation.*

CONDITIONS: Given a description of a treatment plant, the job description of the new employee, an orientation schedule and materials.

ACCEPTABLE PERFORMANCE: The student will:

Introduce the employee to his supervisors and other employees.

Tour the treatment plant.

Apply the orientation schedule and program.

Evaluate the effectiveness of the orientation program.

INSTRUCTOR ACTIVITY:

1. Comment on the introduction techniques of the supervisor.
2. Observe the student's behavior, commenting on the effectiveness of the tour.
3. Assess student reactions to the orientation simulation. Discuss the effectiveness of the presentations.
4. Discuss techniques for assessing the effectiveness of an orientation program.

STUDENT ACTIVITY:

1. Introduce a new employee to plant personnel with students playing the various roles.
2. Show the new employee through the treatment plant, pointing out locations where he will work.
3. Display orientation materials gathered or developed to students playing the role of new employees. Explain the purpose of the activities included in the program.
4. Ask the employee to evaluate the effectiveness of his orientation, detailing its most relevant aspects and commenting on additional information or activities which should be included or those which should be omitted. Ask his supervisors to report on the effects of his orientation on his adjustment to the job.

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Module 8

DISCIPLINING EMPLOYEES

PURPOSE: Treatment plant rules and regulations are enforced through disciplinary actions ranging from oral reprimands to suspension without pay. Written guidelines usually prescribe the kinds of discipline, when they may be used and the procedures for using them. In this module the student will decide whether employee actions warrant discipline. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES:

108	109	281	328	329	337	338	340	352	390
1072	1073	1172	1187	1191	1229	1519	1528	1533	1612
1615	1711	1712	1713	1714					

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OBJECTIVE 8.1: *Describe employee discipline procedures.*

CONDITIONS: Given a description of the actions warranting discipline, including:

- continual inaccuracies
- damage to or loss of plant property
- discourteous attitude toward the public
- disregarding safety regulations
- disruptive behavior
- excessive absence
- habitual tardiness
- inefficiency
- insubordination
- insufficient initiative
- lack of performance
- personal appearance
- poor housekeeping
- sleeping on the job

ACCEPTABLE PERFORMANCE: The student will:

Explain why an action warrants discipline.

List the kinds of information used to make decisions when considering disciplinary action against an employee, including:
- civil service rules
- documentation of employee actions
- original test performance
- past history
- performance evaluations
- plant personnel rules and regulations
- supervisor's personal diary
- time records
- union agreements

Determine whether discipline is warranted, considering the reasons for the employee's actions, including:
- attitude toward plant
- attitude toward self
- basic attitude
- improper supervision
- incompetence
- incomplete orientation
- insufficient training
- personal problems
- relationship to co-workers

Recommend supervisory actions other than discipline which would improve the employee's performance.

Describe the kinds of discipline, commenting on the situations in which they should be used, including:
- demotion
- loss of vacation
- oral reprimand
- reduction in pay
- suspension
- withholding of pay increases
- written reprimand

Describe the procedures for informing an employee when disciplinary actions are taken and how the behavior of the supervisor can affect the future performance of the employee.

Consider the effect of the disciplinary action on:
- other employees
- plant performance
- privacy of the employee
- the disciplined employee
- the employee's future performance

INSTRUCTOR ACTIVITY:

1. Describe the employee actions warranting discipline and the effects of these actions on plant operation.

2. Display the information used to make decisions about disciplinary action.
3. Present case histories of employees' actions. Ask students to decide whether the employees should be disciplined.
4. Discuss other actions which a supervisor might take in addition to or in place of discipline to change an employee's behavior.
5. Describe the kinds of discipline and the situations for which they are appropriate.
6. Present case histories of supervisors disciplining operators. Comment on the effectiveness of their techniques.
7. Describe the effects that disciplinary actions may have on the disciplined employee, other employees and plant performance.

STUDENT ACTIVITY:

1. Discuss the effects of disregard for plant rules and regulations on plant operation.
2. Develop a checklist of the information used to make decisions about discipline.
3. Discuss whether the employee should be disciplined, supporting the decision.
4. Recommend other actions a supervisor might take to change an operator's behavior.
5. Review case histories of disciplinary actions, commenting on the appropriateness of the method of discipline.
6. Develop a set of guidelines for a supervisor to use when disciplining an employee.
7. Discuss case histories of the effects of discipline on the disciplined employee, other employees and plant performance. Decide whether the discipline was effective.

<<<<<<>>>>>>

OBJECTIVE 8.2: *Discipline an employee.*

CONDITIONS: Given a description of actions warranting discipline and information used when considering disciplinary actions.

ACCEPTABLE PERFORMANCE: The student will:

Review the circumstances and causes of the actions warranting discipline.

Choose a discipline procedure, justifying the decision.

Take disciplinary action.

Evaluate the effect of the disciplinary action.

INSTRUCTOR ACTIVITY:

1. Discipline an employee in a simulated situation.
2. Evaluate the student's techniques.
3. Present evaluation of the student's techniques.
4. Set up simulated situations in which students as supervisors discipline other students.
5. Present descriptions of the behavior of a disciplined employee several months later.

STUDENT ACTIVITY:

1. Evaluate the techniques of the instructor.
2. Discipline an employee in a simulated situation.
3. React to the instructor's evaluation, justifying the action or suggesting alternative actions.
4. Evaluate the discipline techniques of other students.
5. Evaluate an employee's behavior based on the discipline techniques used.

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Module 9

DISMISSING EMPLOYEES

PURPOSE: Sometimes an employee's behavior justifies dismissal. In this module the student will learn to recognize situations when dismissal is necessary. Documentation and conformity to rules and regulations and the dismissal procedure are emphasized. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES:

108 109 281 328 329 337 338 340 352 390
540 544 1072 1073 1172 1187 1191 1229 1519 1528
1533 1612 1615 1711 1712 1713 1714

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OBJECTIVE 9.1: *Describe procedures for dismissing an employee.*

CONDITIONS: Given a list of employee actions which warrant dismissal, including:

- continued poor performance
- conviction of a crime
- destruction of equipment
- discourtesy to the public
- disregarding safety regulations
- excessive absences
- insubordination
- intoxication on the job
- personal assault
- sleeping on the job
- theft of plant property

ACCEPTABLE PERFORMANCE: The student will:

Explain why an action warrants dismissal.

List the kinds of information used to make decisions when considering the dismissal of an employee, including:

- civil service procedures
- employee's personnel record

federal, state and city laws
personal diaries
plant logs
plant policy statements
rules and regulations
union contracts

Determine whether dismissal is warranted, considering the reasons for the employee's actions, including:
inadequate challenge or excessive demands
incompetence
insufficient training
management failures
personal problems

Consider the effect of the employee's dismissal on:
other employees
plant performance
the dismissed employee

Describe dismissal procedures, including voluntary resignation.

INSTRUCTOR ACTIVITY:

1. Describe the employee actions warranting dismissal and the effects of these actions on plant operation.
2. Display the information used to make decisions about dismissal.
3. Present case histories of employees' actions. Ask students to decide whether employees should be dismissed.
4. Discuss other actions which a supervisor might take instead of dismissal to change an employee's behavior.
5. Discuss the student's recommendations for dismissal, commenting on the information and documentation of the actions used to support the decision.
6. Describe the effects that dismissal may have on the employee, other employees and plant performance.
7. Present case histories of supervisors dismissing operators. Comment on the effectiveness of their techniques.

STUDENT ACTIVITY:

1. Discuss the effects of the actions warranting dismissal on plant operations.
2. Develop a checklist of the information used to make decisions about dismissal.
3. Discuss whether the employees should be dismissed.
4. Recommend other actions a supervisor might take to change an operator's behavior.
5. Recommend dismissal where appropriate, supporting the decision.

6. Discuss case histories of the effects of dismissal on the employee, other employees and plant performance.
7. Develop a set of guidelines for a supervisor to use when dismissing an employee.

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OBJECTIVE 9.2: *Dismiss an employee.*

CONDITIONS: Given a description of the actions warranting dismissal and information used when considering dismissal of an employee.

ACCEPTABLE PERFORMANCE: The student will:

Review the circumstances and causes of the actions warranting dismissal.

Support the decision to dismiss an employee with documentation.

Institute dismissal procedures.

Evaluate the effects of the dismissal.

INSTRUCTOR ACTIVITY:

1. Dismiss an employee in a simulated situation.
2. Evaluate the student's techniques.
3. Present evaluation of the student's techniques.
4. Set up simulated situations in which students as supervisors dismiss other students.
5. Present case histories of the effects of a dismissal on employee and plant performance.

STUDENT ACTIVITY:

1. Evaluate the techniques of the instructor.
2. Dismiss an employee in a simulated situation.
3. React to the instructor's evaluation, justifying the action or suggesting alternative actions.
4. Evaluate the dismissal techniques of other students.
5. Discuss whether the dismissal of the employee had the desired effect on employee and plant performance.

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Module 10

ENCOURAGING PROFESSIONAL DEVELOPMENT

PURPOSE:

Promoting professional growth and providing training for employees are often neglected and seldom included in budgets. Improvement of an employee's capabilities means improved operation. In this module the student will learn to encourage operators to discuss their training needs and to provide information, suggestions, and programs promoting professional growth. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES:

108 109 281 328 329 330 331 334 336 337
338 340 341 342 351 352 376 377 384 390
1072 1073 1128 1171 1172 1176 1178 1181 1186 1187
1189 1190 1191 1195 1196 1197 1200 1204 1205 1207
1225 1229 1382 1514 1515 1516 1518 1519 1521 1525
1528 1529 1534 1535 1612 1615 1616 1617 1628 1711
1712 1713

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OBJECTIVE 10.1:

Describe procedures for promoting the personal and professional growth of an employee.

CONDITIONS:

Given a list of the areas in which personal and professional growth should be promoted, including:

- economic advancement
- formal education
- personal guidance
- professional recognition
- training in maintenance, operation, process control, supervision, basic skills or basic education
- variety of work experience

ACCEPTABLE PERFORMANCE:

The student will:

List the references which provide information about personal and professional growth opportunities,

including:
- correspondence school and course bulletins
- federal and state training opportunities
- in-plant training schedules
- lists of literature
- lists of professional organizations
- local college and technical school bulletins
- manufacturers training schools
- operational unit facility bulletins
- operator organization meetings
- personnel roster of competencies and personal knowledge
- plant library list
- salary schedule

Describe motivational techniques as they relate to the physical, psychological and social needs of an employee.

Discuss alternative approaches and policies for establishing a program for the promotion of personal and professional growth.

Describe the procedures for planning for the promotion of an employee's personal and professional growth, considering:
- ability to take direction
- employee's aptitudes and performance
- leadership abilities
- length of service
- length of time in job class
- previous schooling

Describe the effects of promotion of personal and professional growth on plant performance.

INSTRUCTOR ACTIVITY:

1. Display the references which provide information about professional development opportunities.
2. Describe motivational techniques.
3. Describe alternative approaches to and policies for professional development, commenting on their effectiveness.
4. Discuss the procedure for tailoring a professional development program to the needs and goals of an employee.
5. Describe the effects of a professional development program on plant performance.

STUDENT ACTIVITY:

1. Develop a checklist of the sources of professional development information.
2. Examine case histories of the effects of motivational

techniques, commenting on the results.
3. Contrast the programs of several treatment plants, suggesting changes and improvements.
4. Suggest an appropriate development program after reading profiles of operators.
5. Discuss case histories of the results of a professional development program on plant performance, commenting on their effectiveness.

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OBJECTIVE 10.2: *Promote the personal and professional growth of employees.*

CONDITIONS: Given profiles of the characteristics and capabilities of employees, their job descriptions and references.

ACCEPTABLE PERFORMANCE: The student will:

Locate references and provide information about personal and professional growth opportunities for employees.

Develop individualized growth programs for employees.

Develop policies and plant program for the promotion of employees' personal and professional growth.

INSTRUCTOR ACTIVITY:
1. Present employee profiles to students.
2. Evaluate the growth programs recommended for the employees.
3. Evaluate the plan, policies and implementation procedures recommended by the student.

STUDENT ACTIVITY:
1. Locate the references and information used to plan professional development programs for the employees.
2. Plan professional growth programs for each employee, explaining the decisions.
3. Plan a comprehensive professional development plan for the employees in a treatment plant. Suggest policies and implementation procedures.

Module 11

STAFFING THE TREATMENT PLANT

PURPOSE: In this module the student will learn to determine the size and composition of a wastewater treatment plant staff. Staffs must constantly be adjusted to correspond to the work at hand. Understaffing overloads employees, creates morale problems and important tasks will not be performed when needed. On the other hand, overstaffing wastes money and creates morale problems, too. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES: 108 109 281 348 1384 1390 1391 1392

<<<<<<>>>>>>

OBJECTIVE 11.1: *Describe procedures for staffing a wastewater treatment plant.*

CONDITIONS: Given a description of a treatment plant.

ACCEPTABLE PERFORMANCE: The student will:

List the kinds of personnel on the staff of a treatment plant, including:

- chemists
- electricians
- gardeners
- instrument technicians
- journeyman operators
- laboratory technicians
- laborers
- machinists
- maintenance foremen or supervisors
- operating supervisors
- painters
- plumbers and pipefitters
- secretary-receptionists
- tour guides
- trainees

List the information used to determine the composition and size of a treatment plant staff, including:
- housekeeping
- laboratory schedule
- monitoring requirements
- number and types of major components within each process unit
- number of pieces of equipment
- number of process units
- physical locations
- plant research and modification policy
- policy of company on safety
- preventive maintenance requirements
- proposed budget
- staff required by a similar plant
- workload per unit of operation

List the references used to staff a treatment plant, including:
- as-built prints
- effluent standards or receiving water standards
- engineers' recommendations
- federal and state guidelines
- plant layout
- plant specifications
- Water Pollution Control Federation guidelines

Describe how to determine staff size and composition, commenting on:
- budget limitations
- degree of plant complexity
- degree of protection
- units of standby equipment

Describe staff organizational systems.

INSTRUCTOR ACTIVITY:

1. Present a list of the kinds of personnel in a treatment plant.
2. Display the information and references used to staff a treatment plant.
3. Discuss how to relate staff size to the size of the plant.
4. Describe staff organizational systems, pointing out how they affect staff levels.

STUDENT ACTIVITY:

1. Develop a checklist of plant personnel.
2. Develop a checklist of information and references.
3. Review descriptions of treatment plants. Describe their staffing needs. List criteria for determining staff needs.

4. Outline staff organizational systems, comparing them.

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OBJECTIVE 11.2: *Plan staffing requirements for a treatment plant.*

CONDITIONS: Given the composite model plant, references, plant records and information and the kinds of personnel who work in treatment plants.

ACCEPTABLE PERFORMANCE: The student will:

Locate the information used.

Select the references.

List the kinds of personnel needed, specifying how many of each kind.

Justify the staffing decisions in writing.

Prepare an organizational chart for the treatment plant, based on the recommended staff.

INSTRUCTOR ACTIVITY:

1. Answer questions about the location of information in the references.
2. Evaluate and compare the staffing decisions of the students.
3. Evaluate student justifications, reviewing criteria for staff levels.
4. Comment on the organizational charts.

STUDENT ACTIVITY:

1. Select the references and locate the information.
2. Prepare staffing plans working in committees of students.
3. Present written justification for the decisions.
4. Prepare an organizational chart based on the committee's plan as modified after the instructor's evaluation.

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Module 12

REWARDING EMPLOYEE PERFORMANCE

PURPOSE: In this module the student will learn to recognize employee actions worthy of reward and recognition and to respond appropriately. It is as important to provide recognition when employees develop new ideas, perform above expectations or perform to set standards, as it is to discipline employees for poor performance. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES: 108 109 281 328 329 331 337 338 390 1072 1176 1191 1203 1204 1216 1519 1525 1612 1721

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OBJECTIVE 12.1: *Describe procedures for rewarding employee performance.*

CONDITIONS: Given a list of employee actions deserving recognition or reward, including:

- accuracy
- attendance record
- bravery and quick-thinking
- compatibility with co-workers
- cooperation
- courteous attitude toward the public
- disaster prevention
- efficiency
- following safety regulations
- good housekeeping
- increase in certification
- initiative
- innovation
- performance of duties
- personal appearance
- promptness
- respect for plant property
- superior performance

ACCEPTABLE PERFORMANCE: The student will:

Explain why an action merits recognition.

List the kinds of information used to evaluate employee performance, including:
- civil service procedures
- civil service rules
- documentation of employee actions
- job specifications
- original test performance
- past history
- performance evaluations
- plant logs
- plant personnel rules and regulations
- statements of witnesses
- supervisor's personal diary
- time records
- union agreements
- union contracts

Describe the kinds of rewards and recognition, commenting on the situations in which they should be used, including:
- fringe benefits
- oral commendation
- promotion
- public acclaim
- salary
- security
- status
- transfer
- written commendation

Describe how and when recognition and rewards should be given to employees.

Describe procedures for recommending salary increases and promotions.

Consider the effect of a decision to reward an employee on:
- other employees
- plant performance
- the rewarded employee

INSTRUCTOR ACTIVITY:

1. Describe the employee actions meriting reward and the effects of these actions on plant operation.
2. Display the information used to make decisions about rewarding employee performance.
3. Describe the kinds of rewards and recognition and the situations in which they are appropriate.

4. Present case histories of supervisors rewarding employees. Comment on the appropriateness of the reward.
5. Describe procedures for evaluating performance of employees and recommending salary increases and promotions.
6. Describe the effects that disciplinary actions may have on the disciplined employee, other employees and plant performance.

STUDENT ACTIVITY:

1. Discuss the effects of rewarding employees on plant operations.
2. Develop a checklist of the information used to make decisions about rewarding employee performance.
3. Review case histories of employee recognition, commenting on the appropriateness of the recognition or reward.
4. Develop a set of guidelines for a supervisor to use when disciplining an employee.
5. Review procedures (used by treatment plant managers) for evaluating performance. Rank the evaluation systems according to effectiveness and objectivity.
6. Discuss case histories of the effects of rewarding an employee on the rewarded employee, other employees and plant performance.

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OBJECTIVE 12.2: *Reward an employee's performance.*

CONDITIONS: Given a description of actions deserving recognition or reward and information and references.

ACCEPTABLE PERFORMANCE: The student will:

Review the circumstances surrounding the actions deserving reward or recognition.

Choose a reward or method of recognition, explaining the decision.

Reward or recognize the employee.

Evaluate the effect of the reward or recognition.

Develop a policy for salary increases and promotions.

INSTRUCTOR ACTIVITY:

1. Reward an employee in a simulated situation.
2. Evaluate the student's techniques.

3. Present evaluation of the student's techniques.
4. Set up simulated situations in which students as supervisors reward other students.
5. Present descriptions of the behavior of a rewarded employee several months later.
6. Comment on the promotion and salary increase policies recommended by the student.

STUDENT ACTIVITY:

1. Evaluate the techniques of the instructor.
2. Reward an employee in a simulated situation.
3. React to the instructor's evaluation, justifying the action or suggesting alternative actions.
4. Evaluate the techniques of the other students.
5. Evaluate an employee's behavior based on the rewards used.
6. Recommend promotion and salary increase policies for a treatment plant.

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Module 13

HANDLING EMERGENCIES

PURPOSE: Disruption of wastewater treatment processes because of structural or equipment failures and natural disasters such as floods and earthquakes can cause serious contamination of natural waters and epidemics of major proportion. In this module the student will learn how operators and plant managers plan for emergencies and deal with them when they occur. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES: 108 110 281 392 395 397 640 1125 1396 1397 1462 1468 1476 1477 1478 1482 1483 1484 1485 1486 1487 1488 1489 1561

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OBJECTIVE 13.1: ***Describe procedures for handling emergencies.***

CONDITIONS: Given the composite model plant and a major disaster, including:

- earthquake
- explosion
- fire
- flood
- sabotage
- strike
- structural failure
- total process unit failure
- war

ACCEPTABLE PERFORMANCE: The student will:

List the harmful effects associated with disasters, including:

- contamination of the environment
- damage to process units
- damage to unit components

destruction of process units
destruction of unit components
illness
injury
loss of life
loss of records
loss of supplies
overload of unit processes
pollution of receiving water

List the references used to prepare for disasters in the treatment plant and to implement emergency plans, including:
as-built prints
civil defense procedures
Corps of Engineer procedures
engineering design specifications
equipment manufacturers' manuals
fire department procedures
flow diagram
plant disaster plan
plant maintenance manual
plant operations manual
police department procedures
public health procedures
Water Pollution Control Federation Manual #11

List the harmful effects associated with each disaster and the references to consult to handle the emergency.

Describe procedures for preventing or minimizing the harmful effects of a major disaster, commenting on:
insurance
legal problems
plant design
plant emergency procedures
public notices
the role of police, fire, civil defense and health departments
union contracts

Describe procedures for protecting the safety and health of employees and citizens during a major disaster.

Describe the procedures for handling damage to operations and the plant during a major disaster.

Describe procedures for evaluating the effectiveness of a plant's emergency plans after a disaster and for instituting corrective measures.

Develop a master plan for handling major disasters.

INSTRUCTOR ACTIVITY:

1. List and discuss the harmful effects associated with disasters.
2. Display the references used to plan for and to handle disasters.
3. Outline the harmful effects associated with each disaster. Point out the references which should be consulted.
4. Describe the procedures for preventing or minimizing the harmful effects of a major disaster.
5. Describe the procedures for protecting employees and citizens during major disasters.
6. Describe the procedures for handling plant operations during major disasters.
7. Present typical emergency plans for plant administration during major disasters. Discuss each plan.
8. Describe techniques for evaluating emergency procedures after a disaster.

STUDENT ACTIVITY:

1. Prepare a checklist of the harmful effects of disasters that must be considered when planning for and when handling disasters.
2. Examine the references. Develop a reference checklist.
3. Describe the references which should be consulted for each disaster. Match them with the checklist of harmful effects.
4. Outline the procedures for preventing or minimizing the harmful effects.
5. Outline the procedures for protecting employees and citizens during major disasters.
6. Outline the procedures for handling plant operations during major disasters.
7. Prepare an emergency plan for handling disasters, assigning responsibilities and setting priorities.
8. Discuss the points to consider in evaluating the effectiveness of an emergency plan.

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OBJECTIVE 13.2: *Implement plans for handling a major disaster.*

CONDITIONS: Given the composite model plant, a description of a major disaster, references and the student's checklists.

ACCEPTABLE PERFORMANCE: The student will:

Describe the harmful effects associated with the disaster and select the references used to deal with the emergency.

Institute procedures to protect employees and the public.

Institute procedures to prevent or minimize damage to unit processes and to the plant.

Evaluate the emergency procedures and revise the master plan.

INSTRUCTOR ACTIVITY:

1. Present case histories of major disasters.
2. Comment on the student's evaluations.
3. Present a description of an emergency situation from case histories. With other students, react to the procedures suggested by the student. Point out ways to improve the procedures and considerations which have been overlooked.
4. With other students, react to the procedures suggested to deal with the emergency by the student. Point out ways to improve the procedures and considerations which have been overlooked.
5. Present case histories which include the actions of the operators and the consequences of their actions.

STUDENT ACTIVITY:

1. Describe the harmful effects associated with the disasters and select the references used during the emergency.
2. Evaluate the procedures of the operators in the case histories.
3. Describe and explain the emergency procedures to institute which protect employees and the public during the disasters in the case histories.
4. Describe and explain the emergency procedures to institute which prevent or minimize damage to unit processes and to the plant during the disasters in the case histories.
5. Recommend changes in the operators' emergency plans which would improve results during emergencies.

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Module 14

MAINTAINING DAILY OPERATIONAL CONTROL

PURPOSE: In order to produce an effluent which meets quality standards, plant operations must be closely monitored. In this module the student will learn to recognize when changes in operation are indicated to maintain effective process control and to implement these changes. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES: 108 143 281 1372 1383 1386 1387

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OBJECTIVE 14.1: *Describe procedures for recommending operational changes.*

CONDITIONS: Given the composite model plant, its operational requirements and its specifications, including:
- effluent requirements
- receiving water requirements
- reliability requirements

ACCEPTABLE PERFORMANCE: The student will:

Define design performance, actual performance and problem analysis.

List the references used to recommend operational changes, including:
- as-built prints
- daily plant logs
- effluent standards and receiving water standards
- maintenance manuals
- maintenance schedules
- maintenance service records
- plant operations manuals
- plant performance guides
- plant specifications

List the kinds of information used to recommend operational changes, including:
- chemical usage
- cost
- effluent quality requirements
- equipment history
- equipment in the area of change
- flowmeter readings
- hourmeter readings
- kinds of personnel
- laboratory reports
- location of changes
- monitoring recording charts
- number of personnel
- performance of personnel
- performance of process units
- personnel changes
- personnel in the area of change
- policy changes
- power meter readings
- rate of operational changes
- reliability requirements
- reports of plant performance
- sampling procedures
- shift schedules
- utility requirements

Describe daily operational changes indicated by the information, by the daily and monthly plant performance reports and regulatory agency reports. Note the acceptable ranges of data.

Explain the reasons for the changes, commenting on:
- changing imposed standards
- experimentation
- influent quality
- influent quantity
- personnel morale or changes
- quality control schedule and analysis
- record keeping

Describe how the changes should be implemented, commenting on:
- number of units in service
- process flow configurations
- process loadings
- recycling changes
- upsets

INSTRUCTOR ACTIVITY:

1. Explain the meaning of design performance and actual performance. Define problem analysis.

2. Display and discuss the references used to recommend operational changes.
3. Display and discuss the information used to recommend operational changes.
4. Describe the procedures to follow when deciding whether operational changes are indicated by the reports and information.
5. Describe operational changes and why the changes are necessary.
6. Describe how the recommended changes should be implemented.

STUDENT ACTIVITY:

1. Define the special terms.
2. Examine the references. Develop a reference checklist.
3. Examine the information. Develop a checklist.
4. Analyze daily and monthly performance and regulatory agency reports and other information, noting the ranges of the data.
5. Describe operational changes indicated, explaining the decision.
6. Describe the implementation of recommended changes.

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OBJECTIVE 14.2: *Recommend operational changes.*

CONDITIONS: Given the composite model plant, its operational requirements, its specifications, references and information.

ACCEPTABLE PERFORMANCE: The student will:

Review the information which indicates that operational changes are needed.

Select the references.

Recommend operational changes, justifying decisions.

Implement operational changes.

Evaluate the effects of operational changes.

INSTRUCTOR ACTIVITY:

1. Present information and reports for student review.
2. With the other students react to the procedures suggested. Point out ways to improve the procedures and considerations which have been overlooked.

3. Evaluate the implementation of the operational changes with the other students. Suggest alternative implementation procedures.
4. React to the student's evaluation of the case history.

STUDENT ACTIVITY:

1. Analyze the reports and information, selecting the references used to make decisions about operational changes.
2. Recommend operational changes, explaining why the changes are necessary.
3. Explain how the operational changes should be implemented.
4. Review a month's operation of a treatment plant. Evaluate the operational changes made, suggesting alternative procedures and their consequences.

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Module 15

RECOMMENDING CAPITAL IMPROVEMENTS

PURPOSE: In order to obtain funds for replacement of equipment or the purchase of new equipment, a treatment plant operator must convince the group which allocates funds of the need. In this module the student will learn to recognize when capital improvements are indicated, to recommend improvements and to determine the costs of the improvements. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES: 108 281 346 368 369 374 385 823 824 1220 1386 1520 1567 1582

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OBJECTIVE 15.1: *Describe procedures for determining whether capital improvements are needed.*

CONDITIONS: Given the composite model plant and operational requirements and specifications, including:

- design loadings
- effluent requirements or receiving water standards
- equipment performance specifications
- man-hour distribution chart
- plant performance specifications

ACCEPTABLE PERFORMANCE: The student will:

Explain the meaning of:

- capital depreciation
- capital expenditure
- comparative cost analysis
- depreciation
- efficiencies improvement
- expansion

List the references used when considering capital improvements, including:

- as-built prints

growth predictions
manufacturers' specifications and catalogues
planning agency reports
plant design specifications

List the information used when considering capital improvements, including:
actual loading and performance of units
availability of replacement parts
capability
construction schedules
daily plant fluctuations in flow, personnel, equipment hours, numbers of units in service, costs of maintenance
delivery schedules
industrial expansion plans
laboratory records
local business news
maintenance records
manufacturers' bid prices
plant logs
representative's bid sheet
responsible bids
specifications of existing equipment
use of effluent

Describe and explain the capital improvements indicated by changes in:
availability of new and more efficient tools
change in quality of receiving waters
community growth
downtime
effluent standard changes
increased loading to receiving waters
increases in overtime man-hours
industrial growth
loss of efficiency
maintenance costs
operating and maintenance cost changes
operational costs
policy changes

Describe and explain the capital improvements indicated by process variations, commenting on:
efficiencies
flow configuration changes
industrial wastes
influent quality
influent quantity
loading on all units
temperatures
unit effectiveness

Describe procedures for determining the cost of capital improvements, considering:
- comparison of existing costs with new costs
- considering alternative costs or savings
- cost expected per unit
- increased man-hours
- initial costs
- man-hours saved

INSTRUCTOR ACTIVITY:

1. Define the special terms.
2. Display and discuss the references used when considering capital improvements.
3. Display and discuss the information used when considering capital improvements.
4. Describe the changes in plant operations and process variations which indicate that capital improvements may be needed.
5. Describe the procedures to follow when deciding what capital improvements are indicated by the changes.
6. Present a list of changes in plant operations and process variations and explain why capital improvements must be considered.
7. Describe the procedures for determining the cost of recommended capital improvements.

STUDENT ACTIVITY:

1. Explain the meaning of the special terms.
2. Examine the references. Develop a reference checklist.
3. Examine the information. Develop a checklist.
4. Outline the changes in plant operations and process variations which indicate that capital improvements may be needed.
5. Outline the procedures for making decisions about capital improvements.
6. Explain why the changes in plant operations and process variations must be considered.
7. Note the calculations and the procedures used to determine the costs of capital improvements.

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OBJECTIVE 15.2: *Recommend capital improvements.*

CONDITIONS: Given the composite model plant, operational requirements, specifications, performance parameters, references and information.

ACCEPTABLE PERFORMANCE: The student will:

Review the information which indicates that capital improvements are needed.

Select the references.

Recommend capital improvements, justifying decisions.

Outline the costs of the capital improvements.

INSTRUCTOR ACTIVITY:

1. Present case histories of the operational changes and process variations in plants during a calendar year.
2. With other students react to the improvements suggested by the student. Point out considerations which have been overlooked.
3. Review the costs, playing the role of the chief financial officer.

STUDENT ACTIVITY:

1. Review the information and select the references which are needed to determine whether capital improvements are necessary.
2. Describe and explain the capital improvements indicated.
3. Compute the costs of the improvements.

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Module 16

EXPLAINING OPERATIONS TO CITIZENS

PURPOSE:

In an age when the quality of the environment becomes more and more central to the survival of mankind and concerns about energy sources are spotlighted, citizens' interest in the quality of wastewater treatment are heightened. Plant operators are frequently expected to explain plant operations to citizens' groups. In this module the student will learn to describe plant operations in nontechnical language and to choose information and presentation techniques. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES:

106 281 347 378 382 383 1169 1173 1179 1208
1402 1425 1517 1522 1523 1527 1531 1613 1614 1710

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OBJECTIVE 16.1:

Describe procedures for explaining the operations of a wastewater treatment plant in nontechnical terms.

CONDITIONS:

Given the composite model plant and a list of the kinds of groups seeking information about treatment plant operations, including:

- citizens groups
- civic and service clubs
- ecologists
- educators
- members of state and federal agencies
- public officials
- school children

ACCEPTABLE PERFORMANCE:

The student will:

List the situations in which an operator must discuss plant operations in nontechnical terms, including:

- city council meetings
- finance committee meetings
- news conferences

plant tours
public hearings
public and private gatherings
television and radio interviews
visits to schools

List the references used to prepare a nontechnical presentation, including:
annual reports
budget records
flow diagrams
laboratory reports
maintenance records
plant drawings
plant model
plant specifications
receiving water quality reports
training manuals

List the kinds of information to be presented, including:
capital costs
career opportunities
characteristics of the wastestream
costs
description of the processes
duties of personnel
economic benefits of treatment
efficiencies
esthetic benefits of treatment
finance
health benefits of treatment
importance of the processes
monitoring procedures
names of the processes
National Pollutant Discharge Elimination System
number of personnel
service area
sewage charges
sources of wastewater
qualifications of personnel
quality of effluent
use of effluent

List and describe ways to present the information, including:
analogies
annual report
flow diagrams
graphs
illustrations

maps
plant model
slides

Describe the kinds of information appropriate for each group, considering:
facilities available
group attitude
interest value
kind of group
location of group
political or community influence
previous knowledge

List the kind of presentation appropriate for conveying the information to each group.

Describe presentation techniques and considerations, including:
clarity
confidence
length of presentation
maintaining interest
nontechnical language
personal appearance
poise
simplicity

INSTRUCTOR ACTIVITY:

1. Describe the situations in which an operator must discuss plant operations.
2. Discuss and display the references used to prepare public relations presentations.
3. Discuss the kinds of information to be presented.
4. Describe ways to present the information, giving examples.
5. Discuss the kind of information and presentation appropriate for each group, presenting examples.
6. Discuss presentation techniques.

STUDENT ACTIVITY:

1. List the situations in which an operator must discuss plant operations.
2. Prepare a checklist of references.
3. Prepare a checklist of information to be presented.
4. Discuss appropriate ways to present each kind of information.
5. Describe the information and presentation appropriate for each group.
6. Prepare a checklist of presentation techniques.

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OBJECTIVE 16.2: *Plan a presentation for a community group.*

CONDITIONS: Given the composite model plant, a list of the kinds of audiences, meetings and situations for which presentations must be planned and the student's checklists.

ACCEPTABLE PERFORMANCE: The student will:

Select the references.

Select the information for the presentation, considering its appropriateness for the group and situation.

Select methods of presentation.

Write the presentation and prepare audio-visual materials.

Deliver the presentation.

Evaluate the presentation.

INSTRUCTOR ACTIVITY:

1. Describe the group and situation in which a presentation must be made. Evaluate the appropriateness of the information chosen.
2. React to the student's plan with the other students.
3. Comment on the terminology, the length and the clarity of the presentation.
4. Observe the presentation. Note the student's presentation techniques while the other students play the role of the citizens group for whom the presentation is designed.
5. Discuss the evaluation and the student's self-evaluation.

STUDENT ACTIVITY:

1. Select the references and locate the information needed for the presentation.
2. Select the methods of presentation. Describe them.
3. Prepare the presentation and the visual materials.
4. Deliver the presentation.
5. Prepare a self-evaluation. Revise the presentation.

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Module 17

RESPONDING TO COMPLAINTS

PURPOSE:

Complaints are received more and more frequently as citizens demand a high quality environment free from noise, objectionable odors and eyesores. Citizen complaints should receive prompt attention and thorough investigation, since the reputation of the treatment plant suffers if operators are indifferent to citizen complaints. In this module the student will learn to determine whether a complaint is valid and respond to the complaint. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES:

108 281 417 1174 1194 1531

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OBJECTIVE 17.1:

Describe procedures for responding to complaints.

CONDITIONS:

Given complaints from citizens and public officials about:

- accidents
- behavior of personnel
- cave-ins
- economic depreciation of adjacent property
- esthetics
- expenditures
- flooding
- health
- odor
- overflows
- rates
- safety

ACCEPTABLE PERFORMANCE:

The student will:

List the information used when recording complaints and assessing the validity of complaints, including:

- address
- city maps

complaint report
functions of other departments
name
nature and details of complaint
plant operation reports
previous complaint records
receiving water reports
sewer line prints
telephone numbers
sewer maintenance records
utility maps

Describe circumstances which cause complaints, including:
design shortages
failure of units
improper operation
lack of control
personal attitude of plaintiff
plugs
poor maintenance
poor public relations
ventilation

Describe procedures for assessing validity of complaints.

Describe the actions to take from receipt of the complaint to evaluation of the operator's response to the complaint, commenting on:
contacts with the complaintant
correction of the problem
evaluation of the solution
prevention of further occurrences
previous complaints about the same problem
previous complaints from the same person
public relations
punctual response
tact

INSTRUCTOR ACTIVITY:

1. Discuss the information used to record complaints and assess the validity of the complaints.
2. Describe the circumstances which could cause the situations about which citizens complain.
3. Describe the procedures for determining whether complaints are valid.
4. Describe the actions an operator takes when receiving a complaint.

STUDENT ACTIVITY:

1. Prepare a checklist of information.

2. Note on the list of complaints circumstances which may cause the complaint.
3. Note the procedures for determining whether complaints are valid.
4. Develop a policy for dealing with complaints, detailing all actions to take.

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OBJECTIVE 17.2: *Respond to complaints.*

CONDITIONS: Given complaints from citizens and public officials and information used to assess the validity of complaints.

ACCEPTABLE PERFORMANCE: The student will:

Review the circumstances of complaints, investigating situations which could cause the complaints.

Assess the validity of complaints, explaining his conclusions.

Respond to the complaintant, explaining the actions taken in response to the complaint.

Evaluate the effectiveness of the response to the complaint.

INSTRUCTOR ACTIVITY:

1. Set up a series of complaints for the students to investigate.
2. Present case histories of complaints. Evaluate the students' explanations.
3. Observe the students.
4. Evaluate the students' techniques in responding to the citizens.

STUDENT ACTIVITY:

1. Review the recorded information about the complaints and investigate them while other students role play the complaining citizens.
2. Explain the possible causes of the complaints.
3. Respond to the complaints of students who role play citizens.
4. Evaluate the actions based on the developed policy.

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Module 18

SEEKING SUPPORT FOR INCREASED FUNDING

PURPOSE: Public support for appropriation of funds for wastewater treatment plant expansion programs can be gained by documenting the need and explaining the costs to citizens and politicians in nontechnical terms. In this module the student will learn to prepare speeches and press releases about plans for expansion. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES: 108 281 382 385 813 823 1188 1201 1220 1520 1523 1531 1582

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OBJECTIVE 18.1: *Describe procedures for gaining public support for bond issues, millage increases and rate increases.*

CONDITIONS: Given a list of the groups to whom increased appropriations must be justified and situations in which justifications are presented, including:

- citizens groups
- city council meetings
- civic and service clubs
- ecologists
- educators
- finance committee meetings
- members of state and federal agencies
- news conferences
- plant tours
- public and private gatherings
- public hearings
- public officials
- school children
- television and radio interviews
- visits to schools

ACCEPTABLE PERFORMANCE: The student will:

Define revenue bonds, state and federal grants and general obligation bonds.

List the references used to prepare statements supporting bond issues, millage increases and rate increases, including:

- annual plant reports
- anticipated changes in effluent standards
- as-built prints
- effluent standards
- *Engineering News Record* index
- engineer's preliminary report
- health department reports
- industrial expansion reports
- local water survey reports
- original plant design reports
- planning commission reports
- plant specifications
- population growth reports
- soil condition reports
- water quality standards

List the kinds of information to be presented, including:

- agency enforcement procedures
- changes in service boundaries
- community health requirements
- cost of sewer line
- cost presentations
- costs of present operation
- flow data
- industrial expansion
- interest rates
- local construction costs
- miles of existing sewer lines
- number of new households
- plant efficiency
- plant performance data
- predicted needs
- quality of effluent
- rate of economic change
- sewer use rates
- soil perculation tests
- sources of appropriations
- state and federal standards
- surcharges

List and describe ways to present the information, including:
- diagrams
- graphs
- illustrations
- maps
- press releases
- reports
- slides

Describe the kinds of information appropriate for each group, considering:
- competing community concerns
- interest
- philosophy
- previous positions on the issue
- public awareness
- the kind of group

Describe techniques for preparing press releases and speeches, commenting on:
- accuracy
- anticipating questions
- assessing sympathies and antagonisms
- attention to detail
- clarity
- completeness
- length of presentation
- maintaining interest

Comment on reasons for seeking additional supporting funds, including:
- community growth
- efficiency losses
- effluent uses
- flow changes
- industrial growth
- new transportation facilities
- population growth
- standard changes
- tax or rate structure changes
- water quality requirements

INSTRUCTOR ACTIVITY:

1. Define the special terms.
2. Display and discuss the references used to prepare statements in support of tax or rate increases.
3. Discuss the kinds of information to be presented.
4. Describe ways to present the information, giving examples.

5. Discuss the kinds of information and presentation appropriate for each group, presenting examples.
6. Discuss techniques for preparing press releases and speeches.
7. Discuss supporting arguments.

STUDENT ACTIVITY:

1. Explain the meaning of the special terms in nontechnical language.
2. Prepare a checklist of references.
3. Prepare a checklist of information to be presented.
4. Discuss appropriate ways to present each kind of information.
5. Describe the information and presentation appropriate for each group.
6. Describe techniques for preparing press releases and speeches.
7. Outline supporting arguments.

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OBJECTIVE 18.2: *Prepare press releases and speeches describing the need for additional funds.*

CONDITIONS: Given a list of community groups, situations in which needs for additional funds are supported, references and information.

ACCEPTABLE PERFORMANCE: The student will:

Select the references.

Select the information for the presentation.

Write the press releases.

Write and deliver speeches.

Evaluate the effects of the presentation.

INSTRUCTOR ACTIVITY:

1. Evaluate the appropriateness of the information selected.
2. Evaluate the style and effectiveness of the press releases.
3. Evaluate the speeches, commenting on the appropriateness of the information and presentation for the audience.

4. Listen to the speeches. Evaluate the student's presentation techniques while the other students play the role of the citizens group for whom the presentation is designed.
5. Discuss the evaluation and the student's self-evaluation.

STUDENT ACTIVITY:

1. Select the references and locate the information.
2. Write press releases, explaining why the tax or rate increases are needed.
3. Write speeches.
4. Deliver the speeches.
5. Prepare a self-evaluation. Revise the presentation.

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Module 19

PROMOTING THE TREATMENT PLANT IMAGE

PURPOSE:

Plant managers can create a favorable image for wastewater treatment plants by publicizing the meritorious actions of operators and other situations of interest to the public. The skills developed in modules 16, 17 and 18 are important to an effective public relations program. READ PAGES 1 TO 10 BEFORE USING THIS MODULE.

RESOURCES:

108 281 332 333 345 375 813 1177 1188 1202 1531 1609 1614 1618 1827

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OBJECTIVE 19.1:

Describe procedures for promoting the image of the wastewater treatment plant.

CONDITIONS:

Given a list of actions and occasions which should be publicized, including:

- aid to others
- bravery
- disaster prevention
- efficiency under adverse conditions
- increase in certification
- innovation of maintenance procedures
- innovation of operational procedures
- professional service
- reception of awards
- saving a life
- service to the public
- superior performance
- superior safety record

ACCEPTABLE PERFORMANCE:

The student will:

List the kinds of information used to promote the image of the wastewater treatment plant, including:

- description of meritorious acts
- job specifications

operator's reputation
personnel records
photographs
plant reports
state reports
statements of witnesses
written statements

List the points to consider when making public relations decisions, including:
location of performance
newspapers
past performance of the operator
plant reward system
professional associations
publications
radio
television
training of the operator

Describe public relations techniques as they relate to a wastewater treatment plant.

INSTRUCTOR ACTIVITY:

1. Discuss and display the kinds of information used to promote the plant.
2. Discuss the points to consider when promoting the plant.
3. Describe public relations techniques.

STUDENT ACTIVITY:

1. Prepare a checklist of the information.
2. Prepare a checklist of considerations.
3. Develop a public relations program and policy for a treatment plant.

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OBJECTIVE 19.2: *Promote the image of the treatment plant.*

CONDITIONS: Given a list of actions and occasions which should be publicized and information.

ACCEPTABLE PERFORMANCE: Review the circumstances of the actions and occasions which should be publicized.

Choose a public relations technique, explaining the decision.

Initiate public relations procedures.

INSTRUCTOR ACTIVITY:

1. Present case histories of actions and situations meriting publicity. Comment on the student's evaluation.
2. Present case histories of public relations campaigns.
3. Present actions and situations meriting publicity. Comment on the student's campaigns.

STUDENT ACTIVITY:

1. Evaluate the actions and situations for public relations value.
2. Comment on the effectiveness of the campaigns. Suggest additional procedures.
3. Outline and describe public relations campaigns.

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